HELIOS II
Disk Memory System

When you want big system performance from your small computer, turn to Processor Technology's Helios II Disk Memory System. Helios II brings your small computer up to a level fully comparable and frequently superior to many mini-computer systems. Perhaps best of all, you can reach this point for thousands of dollars less than the typical mini-computer installation.

Today, Sol Systems using Helios II and PTDOS (Processor Technology Disk Operating System) are on line doing a variety of business, industrial, engineering, educational and scientific jobs.

A school system has replaced their time share terminals with our stand alone computer. A pharmacy system, specially configured for the Sol/Helios II combination, handles the complex and previously error prone task of prescription processing. Business firms use this powerful system for inventory control, invoicing and payroll. A small college stores the student-faculty directory, course requests, accounts receivable and student schedules on their system.

In the West, an advertising agency is using the system for media analysis while an astronomer plans to use the system to program astronomical observations.

A university reports the Sol System with Helios II provides superior performance for computer assisted and computer managed instruction.

Other applications are continuously under development by Sol/Helios II users everywhere.

Powerful software.

PTDOS 1.4 is a proven disk operating system with total file, device and memory management. Since the prototype was developed in 1975, PTDOS has undergone continuous expansion and refinement.

PTDOS increases the all-important throughput of your computer.

With the command interpreter as a convenient interface to the system, the user can type short commands which perform complex tasks. The powerful DO command provides a facility for editing and executing command procedure files.

Over 40 commands span from simple file management primitives to complex editors, assembler and other data management utilities.

PTDOS 1.4 System Commands

MAJOR SUBSYSTEMS

EDIT	Video Display Text Editor
EDT3	Standard Text Editor
ASSM	8080 Assembler
DEBUG	8080 Program Debugging Aid
DO	Command Interpreter Macro Facility

DISK MAINTENANCE

DISKCOPY	Disk to Disk Copy
RECOVER	Reclaim lost space on disk

INFORMATIVE

FILES	List Information About Files
FREE?	List Remaining Free Space
SYST	List Configuration Information
OPEN?	List Names of Currently Open Files

FILE MANIPULATION COMMANDS

COPY	Move Data Between Files
IMAGE	Save Memory Contents
BLDUTIL	Build Utility File
EXTRACT	Modify or List Image File Structure
KILL	Kill a file
RENAME	Change the name of a file
RETYPE	Change the type of a file
REATR	Change File Protection Attributes

DATA MANAGEMENT

XREF	Assembly Language File Sort and Cross Reference
DUMP	Dump a file in Hex or ASCII
PRINT	Print ASCII contents of text file
RNUM	Renumber an Assembly Language File
SAVE	Create Archive Copy of Files
GET	Load SAVEd files or COPY from a Disk

FILE PRIMITIVES — LOW LEVEL
FILE MANIPULATION

CREATE	Create a new file
OPEN	Open a file
READ	Read a file into memory
WRITE	Write data into a file
CLOSE	Close a file
SPACE	Move File Cursor
RANDOM	Make a file randomly accessible
SEEK	Position the cursor of an indexed file
ENDF	End file at current cursor position

CONFIGURATION AND CONTROL COMMANDS

SETIN	Set CI input file
SETOUT	Set CI output file
SET	Set various miscellaneous parameters
EXEC	Begin execution at some address
ZIP	Set Memory
CONFIGR	Change System Configuration
OUT	Change Console Output Drive

LANGUAGES, PROCESSORS AND GAMES

BASC5	Small BASIC Interpreter
FOCAL	The FOCAL language
TREK80	A video Star Trek game

Languages.

Several high level languages are available. BASIC/5 and FOCAL come with the system. Low cost options include Extended Disk BASIC, Disk PILOT and a FORTRAN compiler extended to support all PTDOS operations.

PTDOS supports device-independent files.

Device files turn any peripheral, such as a printer or tape drive, into a "file." The device file then performs necessary manipulation of the device, for instance, reading a block of data or rewinding a tape mechanism. In this way the device can be accessed as a PTDOS file.

Easy interface at the assembly language level.

System calls provide an easy interface to PTDOS services from any assembly language program.

FORTRAN available March 1978. PILOT available mid-1978.

Memory management provides complete system management of static or dynamic buffers. Fully protected system memory area helps prevent inadvertent destruction of the system or managed data. For added flexibility, the user can manage his own file buffers as well as instruct the system to protect a specified block of memory.

The system utility call provides a powerful path to virtual memory with simple, fast program and data overlays.

Hardware interrupt speeds system operation and allows fast response to device requests for service.

Check these unique features.

Random indexed files offer direct, rapid positioning to any byte or block in a file, anywhere on the disk(s).

BOOTLOAD, a small bootstrap program, loads PTDOS in one simple command. BOOTLOAD, included with the system on a CUTS cassette, is also available as an optional Sol personality module.

A start-up file lets you run any sequence of commands automatically on a bootstrapped system.

Each individual diskette may be named and dated for easy identification.

A disk password with system lock secures your data.

As requirements change, the user can reconfigure the system.

Two drives...a must for any disk system.

The Helios II *dual drive* disk system uses inexpensive, widely available floppy disks for high speed data storage and retrieval. Two drives means you can have two floppy disks on line at all times. The Disk Operating System (PTDOS) resides on part of one diskette — the System Disk. A second diskette provides additional user space and also allows fast and easy production of backup copies to protect critical data.

Helios II uses a unique recording technique known as "firm" sectoring. Under optimum conditions each diskette can store 384,000 bytes of information. That's over 3/4 million bytes on line with each Helios dual

drive. Firm sectoring also allows faster data access and variable block sizes.

Up to four dual drives (8 diskettes) can be accessed by the system so that over 3,000,000 bytes of data are on line.

Fast access.

Helios II is fast, with a typical access time of 33 thousandths of a second. Large block size allows programs and data to be transferred very quickly. A 4K block can be read from the disk to RAM computer memory in the proverbial blink of an eye.

Reliable performance.

Helios II was designed for system reliability using proven technology. No compromises are made nor chances taken with your data. Standard single sided diskettes store data using 77 tracks on each 8-inch diskette. Such data formatting has been used over the years for consistent, reliable storage. Helios II uses direct memory access (DMA) to asynchronously transfer data to and from memory. Data transfers are made at an effective rate of over 660,000 bytes per second. Data integrity is assured with a standard hardware CRC error test performed on each transfer to or from the diskette. In addition, an optional read-after-write verify mode can be selected to handle crucial data requirements. Three level, triple option error handling and trapping allows up to nine different ways to handle errors on every system call.

Helios II comes complete with dual drive, cabinet, controller, PTDOS System Disk, power supply, case, all necessary cables, and full systems documentation. A 12K program that tests and reports on every aspect on your disk system is included.

PTDOS Users Group.

HELIUM is an independent organization of HELIOS users. It publishes a newsletter with useful hints, systems support and updated PTDOS information. To join, write to HELIUM, c/o Ian Kettleborough, P.O. Box 9269, College Station, TX 77840.

HELIOS II SPECIFICATIONS

Electrical Power Requirements

117 Volts, 60 Hz AC
Controller: 7.25 VDC min.
  8 VDC at 1600 ma typical
Formatter: 7.25 VDC min.
  8 VDC at 600 ma typical
PerSci Model 270 Drive:
  + 5 VDC 1.7 amps nominal
  − 5 VDC 0.15 amps nominal
  +24 VDC 1.0 amp nominal — seeking
  0.2 amp nominal — not seeking

Operator Controls and Indicators

Locking power switch with key
Motorized disk eject switches — one for each drive
LED indicators: Unit, Ready, Write, Seek, Power

Physical Dimensions

Height:	9.5 in.	24.13 cm
Width:	14 in.	35.56 cm
Depth:	21 in.	53.34 cm
Weight:	53 lbs.	23.85 kg
Shipping weight:	70 lbs.	31.5 kg

Temperature Requirements

Operational:	50 to 100°F.	10 to 38°C.
Non-operational:	−20 to 120°F.	−29 to 49°C.

Head Positioning

Servo-controlled voice coil — 77 tracks

Head Positioning Times

Track to track, including settling time — 10 msec (maximum)
Track 0 to track 76, including settling — 100 msec (maximum)

Miscellaneous

Cooling — forced air with filter
Direct-Coupled DC Spindle Motor — 360 RPM
Head Engage Time — less than 40 milliseconds
Read/Write Data Transfer Rate — 250 kilobits per second
Recording Capacity — Unformatted: 3.1 megabits per diskette
  Actual data storage capacity: 384,000 bytes per diskette (maximum)

For a new dimension of small computer power, the Helios II Floppy Disk Drive and Processor Technology Disk Operating System. Software includes Extended BASIC, Assembler, PILOT, Extended FORTRAN and FOCAL.